

July 28, 2005

FILED ELECTRONICALLY

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

**Re: Erratum to Comments of Microsoft Corp., Broadcast Signal Lab, LLP, and
Impulse Radio on NRSC-5, MM Docket No. 99-325**

Dear Ms. Dortch:

Microsoft Corporation (Microsoft), Broadcast Signal Lab, LLP, and Impulse Radio (collectively, Joint Commenters) electronically filed joint comments in the above-referenced proceeding on July 18, 2005 (Joint Comments). We hereby submit this Erratum to correct a recently discovered error in the Joint Comments.

Subsequent to our filing the Joint Comments, an inadvertent error in the comments was identified. Specifically, page 3 of the Joint Comments referred to certain National Public Radio (NPR) digital radio multicasting tests as having evaluated “alternative codecs” to the iBiquity HD Radio codec (HDC) using 48 kbps of digital broadcasting bandwidth. In fact, the NPR tests that evaluated digital multicasting at 48 kbps (and other rates) were conducted using the HDC, and demonstrated that the HDC allows multicasting at speeds as low as 48 kbps without substantially reducing audio quality.¹ A separate round of NPR tests using HDC and alternative codecs was conducted at speeds of under 25 kbps only.² As noted in the comments, this second set of tests demonstrated that alternative codecs could be optimized for digital radio services utilizing very narrow bandwidths.

The attached revised comments correct the error in the Joint Comments concerning the NPR tests. We also took the occasion of the filing of this Erratum to correct a typographical error on page 8 of the comments. Because the revisions to page 3 affected the pagination of the comments, we are filing a blacklined, corrected version of the full comments as Attachment 1 hereto. A full clean copy of the corrected comments is attached as Attachment 2.

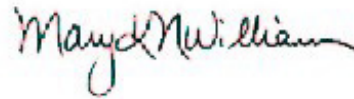
¹ Ellyn G. Sheffield, *Perceptual Tests of iBiquity's HD Coder At Multiple Bit Rates*, at §§ 5.2, 6.0 (Oct. 14, 2004) (attached to *Ex Parte* Letter from Michael Riksen, Vice Pres. for Gov't Relations, NPR, to Marlene H. Dortch, Secretary, FCC, MM Docket No. 99-325 (Oct. 20, 2004) (NPR Oct. 2004 *Ex Parte*)).

² Ellyn G. Sheffield, *Report on Perceptual Tests of Coders at Low- and Very Low-Bit Rates*, at 1 (attached to NPR Oct. 2004 *Ex Parte*)).

The Joint Commenters respectfully request the Commission to accept this Erratum and to replace the Joint Comments in the record with the corrected version in Attachment 2. Because this Erratum is being submitted well in advance of the date for filing replies to comments on NRSC-5, no parties will be harmed by the Commission's acceptance of this Erratum.

We sincerely regret any confusion that may have been caused by the aforementioned error in the Joint Comments. Please address any questions to the undersigned.

Respectfully submitted,

A handwritten signature in blue ink, reading "Mary Newcomer Williams". The signature is fluid and cursive, with the first name "Mary" and last name "Williams" clearly legible.

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Attachments

ATTACHMENT 1

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of:)	
)	
Digital Audio Broadcasting Systems And)	MM Docket No. 99-325
Their Impact on the Terrestrial Radio)	
Broadcast Service)	

**COMMENTS ON
NATIONAL RADIO SYSTEMS COMMITTEE’S
“IN-BAND/ON-CHANNEL DIGITAL RADIO BROADCASTING STANDARD NRSC-5”**

Microsoft Corporation (“Microsoft”), Broadcast Signal Lab, LLP (“Broadcast Signal”), and Impulse Radio (collectively, “Joint Commenters”) submit these comments, in response to the *Public Notice* of June 16, 2005, to identify critical omissions in the proposed National Radio Systems Committee (“NRSC” or “Committee”) *In Band/On-Channel Digital Radio Broadcasting Standard NRSC-5* (“NRSC-5”) and to urge the Commission to require completion of the standard prior to adopting it for digital audio broadcasting (“DAB”).

Specifically, we recommend that the Commission mandate amendments to NRSC-5 that (1) incorporate a codec registration and signaling mechanism that will allow the standard to function effectively on a codec-agnostic basis and (2) specify the iBiquity HD Radio codec (“HDC”) as an initial, market-opening codec within the standard. The Commission should also encourage the NRSC expeditiously to develop and adopt the data transmission portion of the DAB standard. Finally, we ask the Commission to establish an oversight procedure for resolving disputes concerning further development and licensing of the DAB technology.

The Joint Commenters support the Commission's goal of establishing a DAB standard that will foster a smooth transition from analog to digital radio broadcasting,¹ and we commend the NRSC for its efforts to reach consensus on an open standard that will allow the industry to exploit, and consumers to enjoy, the full potential of digital broadcast technology. However, the Committee's work is not yet complete. As proposed, NRSC-5 does not contain enough information to enable full implementation of the in-band, on-channel ("IBOC") digital broadcasting technology already approved by the Commission. Specifically, the standard fails to specify either an initial codec for broadcasting and receiving an IBOC digital audio signal or a registration and signaling mechanism through which to enable alternative codecs.² To facilitate the deployment of DAB devices and services that offer the most benefit to consumers, the Commission should remand NRSC-5 to the NRSC with instructions to complete the standard by incorporating both an initial codec and a mechanism that enables the use of alternative, optional codecs.

I. THE DAB STANDARD MUST ACCOMMODATE MULTIPLE CODECS IF THE MANY POTENTIAL CONSUMER BENEFITS ARE TO BE REALIZED

In IBOC transmissions, audio source coding and compression today are handled by the HDC.³ Going forward, however, the Joint Commenters urge the Commission to ensure that the DAB standard includes the flexibility for broadcasters and equipment manufacturers to employ alternative codecs in DAB services and receivers. Enabling this type of flexibility will bring important benefits to consumers.

¹ See, e.g., Comments of Microsoft Corporation, *Digital Audio Broadcasting Systems and Their Impact on the Terrestrial Radio Broadcast Service*, MM Docket No. 99-325 (Jun. 16, 2004).

² See Letter from Consumer Electronics Association & National Association of Broadcasters to Marlene H. Dortch, Secretary, FCC (May 18, 2005) ("NRSC-5 Cover Letter").

³ See *id.*

First, the availability of alternative codecs would facilitate new and innovative digital broadcasting services enabled by alternatives to the HDC. For instance, National Public Radio (“NPR”) has tested radio multicast services using the HDC alternative codecs that, without substantially reducing ~~sacrificing~~ audio quality, use only 48 kilobits per second (“kbps”) of the 96 kbps of bandwidth available to each digital radio station operating in the Hybrid IBOC mode.⁴ NPR proposes to use the remaining bandwidth to offer multicast services, which could include twenty-four hour jazz, classical, and news-talk format offerings.⁵ In addition, NPR has tested alternative codecs utilizing lower bit rates (under 25 kbps) which could enable the provision of narrower applications, including public service applications such as digital reading services for the blind, full-time traffic and weather broadcasts, or foreign language services, using very ~~only~~ small portions of digital radio bandwidth.⁶ Other codecs could emerge that are optimized for alternative platforms, such as PC implementations.

Although the NPR tests show that a single codec, such as HDC, could successfully be used over a range of data rates and implementations, they also indicate that other codecs might be optimized for particular applications with higher efficiency and/or quality than would be possible for a single, generalized codec. Given that NRSC-5 allows up to eight audio services to coexist within the relatively constrained bandwidth of a single IBOC DAB channel, it is quite conceivable that such highly efficient and optimized codecs would be in demand. These

⁴ See Ellyn G. Sheffield, *Perceptual Tests of iBiquity’s HD Coder At Multiple Bit Rates*, at §§ 5.2, 6.0 (Oct. 14, 2004) (attached to *Ex Parte* Letter from Michael Riksen, Vice Pres. for Gov’t Relations, NPR, to Marlene H. Dortch, Secretary, FCC, MM Docket No. 99-325 (Oct. 20, 2004) (NPR Oct. 2004 *Ex Parte*); see also Further Notice of Proposed Rulemaking, *Digital Audio Broadcasting Systems and Their Impact on the Terrestrial Radio Broadcast Service*, MM Docket No. 99-325, 19 FCC Rcd 7505, 7513 n.42 (2004).

⁵ Marc Fisher, “With HD Sound, the Future is Becoming A Lot Less Fuzzy,” *Washington Post*, at N1 (Jul. 10, 2005).

⁶ See Ellyn G. Sheffield, *Report on Perceptual Tests of Coders at Low- and Very Low-Bit Rates*, at 1 (attached to NPR Oct. 2004 *Ex Parte*)).

codecs are most likely to emerge and evolve successfully in the market if the IBOC standard allows their easy and widespread integration.

Second, preserving flexibility in the DAB codec will facilitate future innovation by allowing codecs to evolve without requiring an amendment to the IBOC standard.

Consumers will benefit if digital radio has as much freedom as possible to evolve beyond what can be accomplished today using the HDC. Thus, if the standard enables the substitution of new codecs without the need to amend the IBOC standard, technology developers will have the ability and incentive to pioneer innovative, efficient and feature-rich uses of digital spectrum. And broadcasters will be able to deploy those new innovations and features without the delay that would otherwise result if new codecs could be deployed only after amendment of the IBOC standard.

To realize the benefits afforded by the use of alternative codecs, it is critical that the NRSC-5 standard be amended to incorporate an effective codec registration and signaling mechanism. The NRSC claims that the mere fact that NRSC-5 does not specify a codec means that it is “also possible within the NRSC-5 standard to use audio source coding and compression schemes other than iBiquity’s HD codec.”⁷ However, this possibility is largely theoretical in the absence of an effective codec registration and signaling mechanism. Without registration and signaling, receiver manufacturers do not know which codecs to install in their receivers and broadcasters cannot properly signal which codec is being used in their DAB transmissions. Under this scenario, digital radio receivers that fully comply with all elements of the NRSC-5 standard could be incapable of receiving all digital broadcast signals that also fully comply with

⁷ NRSC-5 Cover Letter.

NRSC-5.⁸ That situation is unacceptable to broadcasters, manufacturers, and consumers alike. It is clear, therefore, that alternative codecs (and the functionalities and services enabled by them) are less likely to be developed and deployed in the absence of an effective registration and signaling system as part of the DAB standard. Accordingly, the Commission should remand the NRSC-5 standard and require the addition of a codec registration and signaling mechanism.

II. TO JUMP-START DIGITAL BROADCASTING, HDC SHOULD BE INCLUDED IN THE STANDARD

The Commission should also require that NRSC-5 be amended to include HDC as an initial codec. As the NRSC has recognized, the NRSC-5 standard “is based on iBiquity Digital Corporation’s IBOC digital radio technology. In the iBiquity system, audio source coding and compression are handled by iBiquity’s HD codec.”⁹ Despite the current status of HDC as the *de facto* exclusive codec, however, HDC is not specified as part of the NRSC-5 standard.¹⁰ This permits HDC to remain outside the NRSC patent licensing policies.

The NRSC represents that “iBiquity has committed to license on reasonable terms and conditions that are demonstrably free of any unfair discrimination all patents necessary to implement NRSC-5, either with or without the HD codec.”¹¹ However, that commitment remains essentially voluntary (and thus could be revised in the future) and provides inadequate

⁸ Digital broadcast signals and receivers would be fully compliant with NRSC-5 if they implemented all the requirements of NRSC-5 and incorporated any functional codec. However, DAB transmitters and receivers will only be interoperable if they use the same codec.

⁹ NRSC-5 Cover Letter.

¹⁰ The failure to specify any codec distinguishes NRSC-5 from other standardized digital broadcasting technologies. For example, the Eureka 147 DAB format stipulates MPEG-1 Audio Layer 2 as a mandatory codec and also allows the use of optional codecs (both open and proprietary) that have been registered with the WorldDAB Forum. The Korean DMB format, currently becoming an ETSI standard, offers two profiles, each including its own mandatory audio codec. ATSC is considering the same optional codec process for DTV. Even beyond the broadcast space, it is anticipated that the HD-DVD format will include multiple mandatory and numerous optional audio and video codecs.

¹¹ NRSC-5 Cover Letter.

assurance that the sole source HDC will be licensed on reasonable terms. Uncertainty about the codec licensing regime, which will affect the supply chain for new DAB products, is likely to slow product development and deployment. Ultimately, broadcasters and manufacturers seeking to deploy digital broadcasting services and receivers could face terms essentially dictated by iBiquity for the right to use HDC. This uncertainty and potential unfairness in the licensing of the DAB codec can be mitigated by including HDC as part of the NRSC-5 standard in order to jump-start the DAB market and by enabling the use of alternative codecs for DAB.

III. THE COMMISSION SHOULD ENCOURAGE THE NRSC EXPEDITIOUSLY TO AMEND THE DAB STANDARD TO ENABLE DATA TRANSMISSION

The NRSC recognizes that the proposed NRSC-5 standard does not include standards for data transmission in digital broadcast signals, and the Committee has committed to adopt data transmission standards shortly. The deployment of digital broadcast capability offers exciting opportunities to expand the data transmission services currently deployed in FM radio subcarriers. However, those services cannot be developed until data transmission standards are specified. Accordingly, we also urge the Commission to encourage the NRSC expeditiously to incorporate open and flexible data transmission standards in the DAB standard.

IV. THE COMMISSION SHOULD ESTABLISH A PROCESS FOR RESOLVING DISPUTES CONCERNING DEVELOPMENT OF THE DAB STANDARD

Finally, the Joint Commenters recommend that the Commission retain on oversight role in the ongoing development and licensing of the IBOC standard that will govern all digital audio broadcasting. In other contexts the Commission has recognized the pitfalls associated with giving a single entity or industry too much control over the development of a standard that the Commission ultimately will adopt or strongly endorse. For example, when the Commission authorized Cable Television Laboratories, Inc. ("CableLabs") to evaluate and approve digital output and content protection technologies for use with digital cable television

accessed through the CableCARD, the Commission reserved the right to review those decisions *de novo*.¹² The Commission later emphasized that “[t]he lack of a timely, fair and neutral process” would slow the development and deployment of digital cable television technology.¹³ To protect against this risk, and to ensure that innovation was not impeded, the Commission provided that any interested party could appeal an initial CableLabs decision concerning a content protection technology to the Commission. In such an appeal, CableLabs bears the burden of proving that its initial determination was justified, including that the objective criteria used to evaluate the application were reasonable and appropriately applied.¹⁴

In the DAB context, iBiquity is in a comparable position because it controls the sole technology approved by the Commission for deploying digital audio broadcasting. Accordingly, to ensure that the process proceeds fairly and that the standard ultimately adopted benefits consumers, we urge the Commission to reserve the right to review all aspects of the decision-making process concerning the DAB standard. Moreover, to the extent that any aspect of the DAB standard remains under iBiquity’s control, the dispute resolution process should also permit the Commission to review the terms and conditions on which iBiquity licenses the technology. In these proceedings, iBiquity should bear the burden of demonstrating that its decisions are reasonable and non-discriminatory. Without this type of Commission oversight, it is possible that iBiquity’s licensing decisions could slow innovation and/or hinder the deployment of new products.

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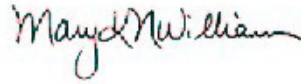
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CONCLUSION

The in-band/on-channel digital audio broadcasting standard has the potential to revolutionize the radio industry by dramatically increasing the features that medium can offer to consumers in a manner that creates incentives for consumers to upgrade to digital radio equipment. However, the standard as presently written is inadequate to enable the full exploitation of the innovative opportunities offered by the technology. The Joint Commenters urge the Commission to remand the standard to the NRSC with instructions (1) to incorporate a codec registration and signaling mechanism to facilitate the deployment of alternative codecs, (2) to specify HDC as part of the standard, and (3) to fully specify a digital radio datacasting standard. We also ask the Commission to develop a dispute resolution process for resolving disputes surrounding the standardization of the IBOC technology. These changes will help to ensure that consumers realize the full benefits of digital audio broadcasting technology and services.

Respectfully submitted,

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DATED: July 18, 2005
CORRECTED: July 28, 2005

ATTACHMENT 2

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Washington, D.C. 20554**

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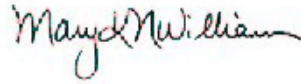
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CONCLUSION

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Respectfully submitted,

MICROSOFT CORPORATION



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